APPENDIX X

Gateway Access and Circulation: Burgess and Niple Multimodal Transportation Study

5.0 GATEWAY ACCESS AND CIRCULATION

5.1 Overview of Issues

The Gateway defines that portion of Areas A and B of Wright-Patterson Air Force Base encompassing the Huffman Prairie Flying Field, Wright Brothers Hill, the Wright Memorial, and the Huffman Prairie Flying Field Interpretive Center. The Wright Memorial is located on Wright Brothers Hill and provides a spectacular view of the Huffman Prairie Flying Field, where the Wright brothers tested and perfected the first practical airplane. The Huffman Prairie Flying Interpretive Center is located adjacent to the Memorial. Due to a variety of constraints, the Huffman Prairie Flying Field is not directly linked with its associated Interpretive Center. The current route is extremely circuitous, and requires access through secure Wright Patterson base entry gates. In order to fully achieve the mission of the Park to provide for visitor understanding and appreciation of the Park resources it is essential that a more direct connection be established between the Huffman Prairie Flying Field and its associated Interpretive Center.

At the outset of the study the Gateway Focus Group met to define study area goals, review existing conditions and identify/confirm constraints. The group concurred with the need to enhance access to and between the two Park sites and identified a variety of challenges that must be overcome in developing options. Those challenges include:

- Overcoming major topography differences between the Memorial and Prairie
- Maintaining Air Force Base security
- Avoiding delays at the Kauffman Road/intersection with State Route 444
- Bridging the freight railroad
- Maintaining integrity of the flood control area operated by the Miami Conservancy District
- Maintaining the steam line serving Wright Field facilities
- Integrating Park bikepaths with the regional bikeway plan.
- Providing multi-modal connections between Gateway elements and other Park units

In addition to these issues and constraints, it is important that any major physical elements in the area preserve the aesthetics of the Wright Memorial. The landscape design firm established by Frederick Law Olmsted, the "father" of landscape architecture in this country, designed this site. It is recommended that the National Park Service's

Olmsted Center for Landscape Preservation be consulted regarding any proposed modifications to ensure that the Olmsted design theme is woven into the fabric of the connection with Huffman Prairie Flying Field.

5.2 Current Park Site Access

Access to the Wright Memorial is currently provided from Kauffman Road near the intersection with SR 444. Characteristics of this roadway approach are described in greater detail below. Although there can be some congestion at the intersection, access and egress to this site is generally good.

Travel from Wright Brothers Hill to Huffman Prairie Flying Field is extremely circuitous. Visitors must pass through the main gate (Gate 12A) at Patterson Field, approximately two and a half miles from the entrance to Wright Brothers Hill. After passing through base security, the visitor continues along a winding path about two miles in length to reach Huffman Prairie Flying Field (Figure 6). The "airline distance" between the Wright Memorial and Huffman Prairie Flying Field is slightly more than half a mile, while the driving distance exceeds four miles.

Huffman Prairie Flying Field access is currently being modified by Wright-Patterson Air Force Base to avoid the secure portion of the Air Force Base and decrease travel distance between these Park sites. This modification is planned to be in place for the Centennial of Flight in 2003. Figure 6 shows the new route using existing Gate 16A to access the Flying Field. This change will reduce the travel distance between the Wright Memorial and the Flying Field by almost a mile.

5.3 Existing Conditions

The existing roadway configuration at SR444 and Kauffman Road is shown in Figure 7. The presence of unique travel movements in the area, proximity of adjacent intersections, multiple travel modes (auto, bike, pedestrian) and surrounding grade changes place substantial demands on this intersection. The primary characteristics of the area are as follows:

- The signalized "T" intersection of SR444 and Kauffman Road handles a large volume of daily traffic. Traffic at this intersection conflicts with egress from Wright Brothers Hill and travel between the two Park sites.

- SR444 also has an intersection with Huffman Dam Road/Marl Road approximately 300 feet west of the Kauffman road intersection. Since this site is located near the SR4/SR444 interchange, it allows only right-in/right-out movements. This roadway complicates potential modifications to the Kauffman/SR444 intersection. The roadway is currently limited to use by Park staff and is not open to the public.

Figure 6: Huffman Prairie Flying Field

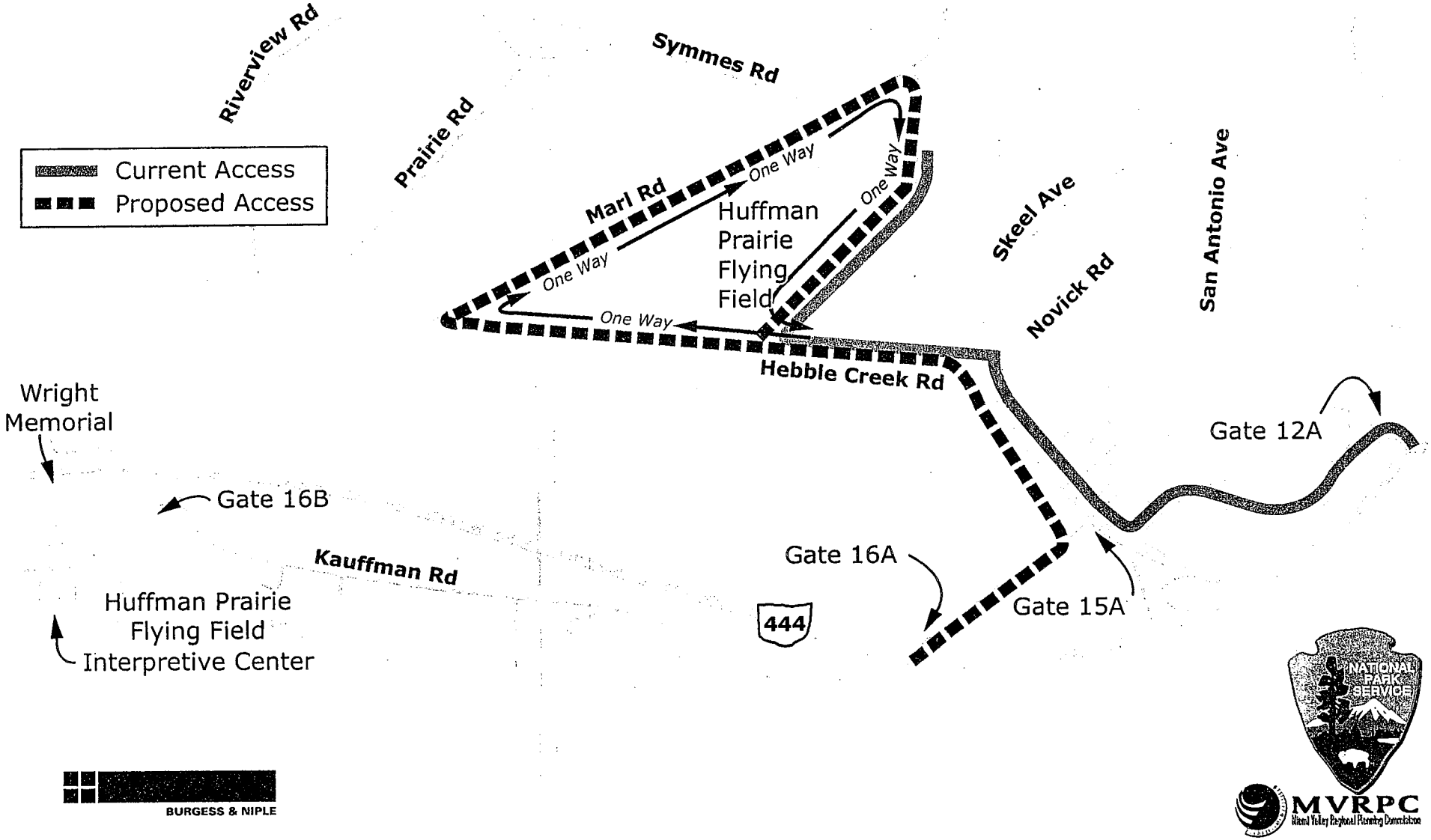
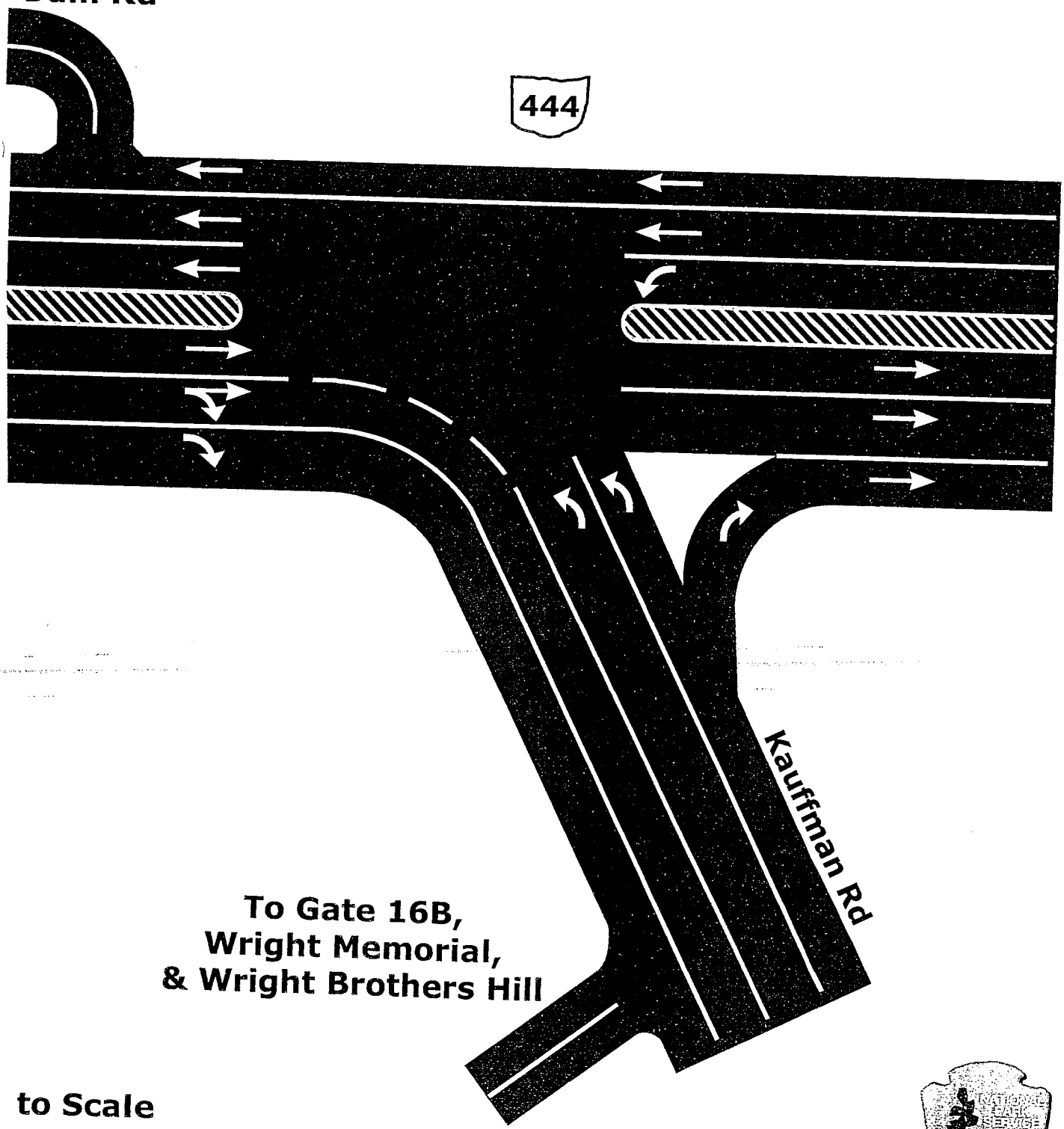


Figure 7: Existing SR 444/ Kauffman Road Intersection



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- Huffman Dam Road has been narrowed and converted to a bikeway with vehicular access restricted to maintenance vehicles only.

- The unsignalized entrance/exit for the Wright Memorial is proximate to the SR444/Kauffman intersection (513 feet). Egress from this site can become difficult due to traffic queuing at the intersection back past the entrance. Current traffic volumes at this location on the entrance road are not likely to justify an additional traffic signal, however this should be monitored closely as visitation to the site increases.

- In the immediate study area, the Kauffman Avenue Bikeway presently has its western terminus at the entrance road to Wright Brothers Hill. A gated fence surrounding WPAFB's field restricts Marl Road access into Huffman Prairie Flying Field. This gate may be opened when the bikeway segment along Marl Road is completed.

- There is a difference in elevation of 135 feet between Wright Brothers Hill and the Flying Field, which has major impacts on the grades for any potential connection between the sites (whether for highway, trolley, or bicycle).

5.4 Known/Planned Improvements

At the outset of this study, there were a number of projects underway and/or in various stages of planning. These projects and a brief description of their relationship to this project are as follows:

- "T-connector" bridge – Greene County has received a Department of Housing and Urban Development (HUD) grant for a bikeway/pedestrian bridge over the railroad and SR 444. The bridge may be a "composite design" (i.e. incorporate the use of plastic material in the structure).

- Kauffman Road Bridge – the Greene County Engineer, through an ODOT program, has successfully obtained a $750,000 grant to replace the deck of the bridge over the railroad. Any attempts to widen the structure (and therefore, the abutments) would entail a lengthy railroad approval process, thereby jeopardizing the construction schedule (complete by 2003) and the funding.

- Huffman Prairie Flying Field (HPFF) – Wright-Patterson Air Force Base and Dayton Aviation Heritage have collaborated in the development of several preservation and environmental planning documents for Huffman Prairie Flying Field to guide the preservation and development of this National Historic Landmark. These include a Cultural Landscape Report and Plan, Long-Range Interpretation Plan, a Wayside Exhibit Proposal, and an Environmental Assessment. Proposed solutions should be consistent with the actions recommended through these planning documents. One significant recommendation (currently being implemented) called for relocation of the

visitor entry point for Huffman Prairie Flying Field from Gate 12A to Gate 16A. This action is being coordinated with ODOT, which must construct turn lanes on that section of SR444 to make Gate 16A functional. Gate 16A is approximately 1.4 miles east of the intersection of Kauffman Road and SR444

- Maintenance building – Five Rivers Metroparks (Metroparks) had abandoned an older brick building located at Huffman Dam. The Miami Conservancy District (MCD) has given Metroparks conditional permission to build a new facility near an existing MCD maintenance building. Any new roadway alignment needs to be sensitive to MCD's and Metropark's needs.

- HPFF Interpretive Center – this facility could not be built at or adjacent to the flying field because of restrictions associated with construction within a flood plain and historic preservation requirements. It is now under construction on Wright Brothers Hill. This location will affect traffic flows and parking (a major concern will be how to handle tour buses).

5.5 Existing and Future Traffic

The traffic analysis in the Gateway area focused upon the intersection of Kauffman Road and SR 444. Most traffic accessing the Wright Memorial currently passes through this intersection. The existing route between the Memorial and Huffman Prairie Flying Field also passes through this intersection. Traffic counts were conducted at this intersection by MVRPC early in the study (October 2000). Traffic forecasts for the years 2005, 2015, and 2025 were also developed by MVRPC. Traffic analyses for existing and future (20-year) conditions were developed for two alternatives:

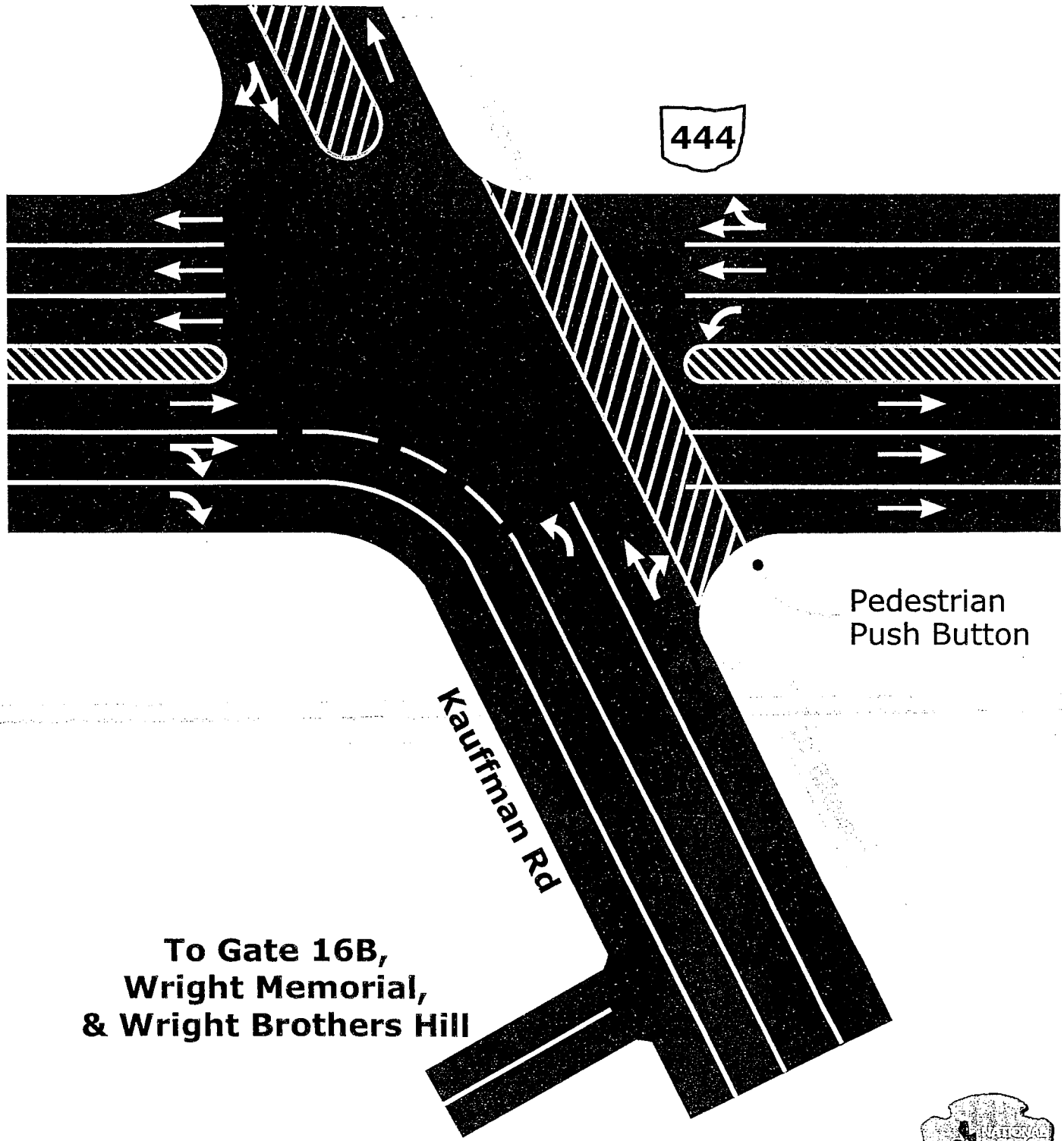
- The existing "T" configuration of the SR444/Kauffman Road intersection.

- A proposed four-legged intersection (Figure 8), which aligns Marl Road opposite of Kauffman Road. This configuration was tested as a possible method to provide direct access between the Wright Brothers Hill and Huffman Prairie Flying Field using Marl Road. Those options are described later in this section.

The analysis considered two different types of performance: queue length and level of service. Queue length demonstrates how far traffic will back up from the traffic signal at the various approaches to the intersection. Queue length is shown in feet for existing and future conditions for both the existing intersection ("T") and the proposed four-legged option. A queue length shown with a "+" indicates that the particular traffic movement is beginning to break down.

Level of Service (LOS) analysis is a measure of expected delay, which reflects the overall ability of the intersection to handle the various travel movements. The levels follow the old "school" grading system, with "A" representing free flow travel conditions and "F" indicating that the particular movement has failed. In addition, the volume/capacity (V/C) ratio included in the following tables reveals how close the

gure 8 - Proposed SR 444 / Kauffman Road Intersection



to Scale

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MVRPC

intersection is to exceeding its practical capacity. Any ratio over 1.0 suggests that the intersection is failing. Tables 2-5 on the following four pages display the results of the analyses for queuing and LOS. Tables 2 and 3 reflect the existing interchange design under current and projected traffic flows, reflectively. Tables 4 and 5 represent the proposed interchange configuration with existing and forecasted traffic.

The tables reflect some minor improvements in LOS in future years, despite the increased traffic volumes. This occurs as modifications are made to signal timing in response the to the changes in traffic. Typically, these changes in LOS occurred for traffic movements that were already "borderline" and required small improvement in order to reach the next highest rating.

Based upon this analysis, the existing intersection will, with one exception, continue to function at an acceptable level through the planning horizon, but with significantly higher delays and longer queues. The one exception is the movement from westbound SR 444 turning left onto Kauffman road (operates at LOS F in the morning peak). This movement could be improved but it would likely reduce the LOS of the eastbound movements on SR 444 somewhat. Analysis for the proposed four-legged configuration indicates several movements suffer a degradation of service for both existing and projected traffic volumes.

Table 2

Queuing Analysis at SR 444 and Kauffman Avenue
(Existing Configuration, Existing Volumes)

95th percentile Queue Length (feet) - SR 444 at Kauffman Avenue

	AM Peak	PM Peak
Eastbound Through & Through/Right	158	107
Eastbound Right	0	0
Westbound Left	127+	36
Westbound Through	31	37
Northbound Left	150	163
Northbound Right	0	0

+ Volume exceeds capacity. Queue may be longer.

Level-of-Service Analysis at SR 444 and Kauffman Avenue
(Existing Configuration, Existing Volumes)

Level-of Service - SR 444 at Kauffman Avenue

	AM Peak	PM Peak
Eastbound Through & Through/Right	A	B
Eastbound Right	A	A
Westbound Left	C	B
Westbound Through	A	A
Northbound Left	C	B
Northbound Right	A	A
Total Intersection v/c	0.65	0.61

Table 3

Queuing Analysis at SR 444 and Kauffman Avenue
(Existing Configuration, Existing + Growth Volumes)

95th percentile Queue Length (feet) - SR 444 at Kauffman Avenue

	AM Peak	PM Peak
Eastbound Through & Through/Right	238	126
Eastbound Right	0	0
Westbound Left	128+	56+
Westbound Through	39	41
Northbound Left	104	213+
Northbound Right	0	0

+ Volume exceeds capacity. Queue may be longer.

Level-of-Service Analysis at SR 444 and Kauffman Avenue
(Existing Configuration, Existing + Growth Volumes)

Level-of Service - SR 444 at Kauffman Avenue

	AM Peak	PM Peak
Eastbound Through & Through/Right	B	B
Eastbound Right	A	A
Westbound Left	E (v/c=0.93)	B
Westbound Through	A	A
Northbound Left	B	B (v/c=0.81)
Northbound Right	A	A
Total Intersection v/c	0.87	0.70

Table 4

Queuing Analysis at SR 444 and Kauffman Avenue/Field Entrance (Proposed Configuration, Existing Volumes)

95th percentile Queue Length (feet) - SR 444 at Kauffman Avenue/Field Entrance

	AM Peak	PM Peak
Eastbound Left	28	63+
Eastbound Through & Through/Right	378	231
Eastbound Right	0	0
Westbound Left	187+	91+
Westbound Through & Through/Right	147	365+
Northbound Left	297+	502+
Northbound Left/Through	295+	502+
Northbound Right	30	0
Southbound Left/Through/Right	59	62

+ Volume exceeds capacity. Queue may be longer.

Level-of-Service Analysis at SR 444 and Kauffman Avenue/Field Entrance (Proposed Configuration, Existing Volumes)

Level-of Service - SR 444 at Kauffman Avenue/Field Entrance

	AM Peak	PM Peak
Eastbound Left	B	D
Eastbound Through & Through/Right	B	C
Eastbound Right	A	A
Westbound Left	F (v/c=0.91)	D
Westbound Through & Through/Right	B	D (v/c=0.87)
Northbound Left	E (v/c=0.80)	D (v/c=0.85)
Northbound Left/Through	E	D (v/c=0.85)
Northbound Right	A	A
Southbound Left/Through/Right	B	C
Total Intersection v/c	0.84	0.78

Table 5

Queuing Analysis at SR 444 and Kauffman Avenue/Field Entrance
(Proposed Configuration, Existing + Growth Volumes)

95th percentile Queue Length (feet) - SR 444 at Kauffman Avenue/Field Entrance

	AM Peak	PM Peak
Eastbound Left	35	93+
Eastbound Through & Through/Right	455	317
Eastbound Right	0	0
Westbound Left	212+	138+
Westbound Through & Through/Right	174	515+
Northbound Left	280+	681+
Northbound Left/Through	282+	681+
Northbound Right	28	0
Southbound Left/Through/Right	53	90

+ Volume exceeds capacity. Queue may be longer.

Level-of-Service Analysis at SR 444 and Kauffman Avenue/Field Entrance
(Proposed Configuration, Existing + Growth Volumes)

Level-of Service - SR 444 at Kauffman Avenue/Field Entrance

	AM Peak	PM Peak
Eastbound Left	B	E
Eastbound Through & Through/Right	C (v/c=0.85)	D
Eastbound Right	A (v/c=0.85)	A
Westbound Left	F (v/c=1.52)	E
Westbound Through & Through/Right	B	D (v/c=0.94)
Northbound Left	D	D (v/c=0.89)
Northbound Left/Through	D	D (v/c=0.89)
Northbound Right	A	A
Southbound Left/Through/Right	B	D
Total Intersection v/c	1.19	0.86

5.6 Preliminary Alternative Development

Based upon an understanding of the study area and project needs, the consultant team developed a number of preliminary options. These options were presented to the stakeholders, Focus Group, and full Steering Committee in order to encourage discussion and expedite creation of practical alternatives for more detailed analysis.

The first set of solutions was developed at a conceptual level (i.e. engineering limited to verifying grades and alignment) with costs based typically on a cost per mile or square foot (for structures) basis. Various alternatives were evaluated on a qualitative basis with respect to their ability to serve the desired transportation functions to and between HPFF and Wright Memorial for various modes of travel (pedestrian, bicycle, auto, bus, electric trolley).

All of the preliminary concepts were developed with the assumption for a potential electric trolley line to operate within the median of SR444. If developed this line would operate from the Riverside/United States Air Force Museum area, would turn north at the intersection of Kauffman Road and SR444, and would proceed out to Huffman Prairie Flying Field following the original railbed (parallel to Marl Road) utilized by the Dayton, Springfield & Urbana Interurban line used by the Wright brothers. The initial concepts are described below (maps are included in Appendix D: Preliminary Gateway Concepts).

- Concept A was the lowest cost option; it consisted of a bike/pedestrian bridge (located west of Kauffman Road) over the railroad and a bike path extending from the entrance to Wright Brothers Hill to Marl Road/Huffman Dam Road. In order to permit pedestrian/bicycle access across SR 444, the existing traffic signal would need to be modified for pedestrian actuation, thus limiting the eastbound continuous right turn from SR 444 to Kauffman Road. This option would cost about $650,000.

- Concept B included the bike/pedestrian bridge over the railroad and added a re-aligned Marl Road (with bike lane) to intersect SR 444 directly across from Kauffman Road. This new intersection provides more direct access through the intersection to HPFF, although it still relies on an at-grade crossing of SR444 by pedestrians and bicycles. The cost estimate for this solution was approximately $2.16 million.

- Concept C included the Marl Road realignment, pedestrian bridge from Concept A and B. (for access to/from the trolley in the SR444 median), and a separate bikeway bridge over the railroad and SR 444, providing a direct connection from the entrance of Wright Hill to Marl Road (which directly serves Huffman Prairie Flying Field). This alternative was estimated at $2.83 million. It removes the at-grade crossing of SR444 by bikes and pedestrians.

- Concept D was the same as Concept C except the bikeway bridge was lengthened to span Kauffman Road as well as the railroad and SR444. The cost estimate increased to approximately $3.73 million.

- Concept E was developed as a "one-way loop" road system so that traffic entered the Wright Memorial at the existing entrance, traveled to Huffman Prairie Flying Field via a new road and bridge (for bikes and vehicles) over Kauffman Road, the railroad, and SR 444, and returned to SR 444 along re-aligned Marl Road. The pedestrian bridge over the railroad tracks was also included in this alternative to maintain walking access between Wright Brothers Hill and the electric trolley in the SR444 median. This option was estimated at about $8.12 million.

- Concept F differed from the previous alternative in that the roadway within the Wright Memorial and the bridge to Huffman Prairie Flying Field were expanded to two-way 2-lane facilities. The Marl Road realignment to the Kauffman/SR444 intersection was dropped while the pedestrian bridge remained. Bike lanes on the new bridge and roadway would accommodate bicycles. This alternative was estimated to cost approximately $10 million.

- Alternative G was similar to Concept F except the electric trolley route was shifted from SR444 to come through WPAFB from the south into the Memorial area and then cross Kauffman and SR444 on a new trolley bridge built parallel to the new bridge identified in Concept F, above. This solution would not require the pedestrian bridge along Kauffman over the railroad since trolley access would be available on the hill itself. The cost estimate for this concept was $11.9 million.

Each concept was developed and displayed in a large format (1" = 300' scale) with standard cross-sections of the facility. Cost estimates were produced for major elements (e.g. bridges, bike path, roadway widening, fill) in addition to a separate estimate for a composite structure for the bike/pedestrian bridge (which was $251,250 more than a conventional bridge). Costs for the trolley system development were not included at this time. This information was presented in a stakeholders working session held November 22, 2000. The stakeholders group was comprised of individuals from the following agencies: National Park Service, Dayton Aviation Heritage Commission, MVRPC, Greene County Engineer, Greene County Park District, WPAFB.

The stakeholders made the following design recommendations based upon their review of the preliminary concepts:

- Because of the amount and speed of traffic, it was determined that at-grade crossings of bicyclists and pedestrians on SR 444 were to be avoided; an underpass beneath SR444 was to be explored and evaluated.

- Grades of the combined bicycle/vehicle bridge over SR444 should (if possible) be limited to a maximum of 3%.

- The cross-section of the bikeway bridge should be 10' of travel space plus a 2' buffer on each side for a total width of 14' between parapets.

- The concept of locating an electric trolley in the SR444 median should be eliminated; this would eliminate the need for a pedestrian-only bridge over the railroad tracks and address several safety and operational concerns.

- A variety of potential trolley routes could be considered connecting the City of Riverside, the US Air Force Museum, Huffman Prairie Flying Field Interpretive Center and the Flying Field. Development of any route option would require the participation and approval of the various entities that have jurisdiction over the route.

5.7 Development of Final Range of Alternatives

Based upon direction from the stakeholders, five alternatives were developed and presented to the Gateway Focus Group on November 29, 2000. These alternatives are presented individually on the following pages. Each page contains a brief description of the alternative and construction cost estimate, followed by a plan view of the proposed solution. The first 3 alternatives present variations of the bikeway element while vehicular traffic is accommodated by a realignment of Marl Road to intersect SR 444 opposite of Kauffman Road. The fourth and fifth alternatives include different approaches to vehicle/bike/trolley combinations with outbound traffic from Huffman Prairie Flying Field brought out into the SR 444/Kauffman intersection. All alternatives and cost estimates assumed that Marl Road would be developed as a boulevard east of the East Well Field. All construction cost estimates included a 20 percent contingency and structural elements (bridges, tunnel) included a 10 percent increase for aesthetic treatments.

The maps in this section focus upon the central area of the Gateway where there is the greatest variation in the alternatives. Each of the options extends the proposed improvements along Marl Road to Pylon Road.

ALTERNATIVE ONE SUMMARY

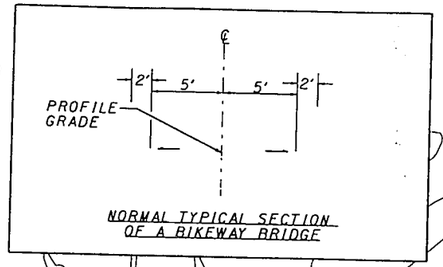
Description:

Alternative One includes a pedestrian/bike bridge west of Kauffman Road, a pedestrian/bike tunnel under SR 444, and relocation of the bikeway to connect to the Huffman Dam Bikeway. Marl Road is to be widened and aligned to connect into SR 444 at the intersection of Kauffman Road the remaining portion of Marl Road would be converted to bikeway.

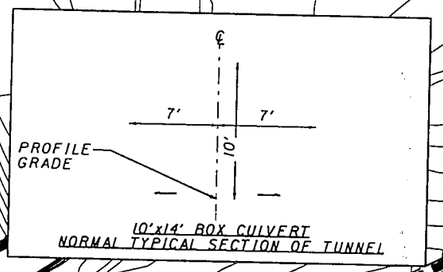
Cost Estimate:

$2,171,615	Pavement
$375,375	Bridge
$132,000	Tunnel
$76,000	Earthwork
$2,755,000	Subtotal
$551,000	Contingency (20%)
$3,306,000	Subtotal
$661,200	Engineering and Construction Management (20%)
$3,967,200	**Total Cost**

FIGURE 9



NORMAL TYPICAL SECTION OF A BIKEWAY BRIDGE



10'x14' BOX CULVERT NORMAL TYPICAL SECTION OF TUNNEL

MARL RD.

SR 444

KAUFFMAN RD.

LEGEND

- PRAIRIE INBOUND ROAD
- PRAIRIE OUTBOUND ROAD
- BIKE/PEDESTRIAN
- TROLLEY (FUTURE)
- BRIDGE
- TUNNEL
- EXISTING BIKE/PEDESTRIAN

N

300 150 0

CALCULATED | CHECKED

DAYTON GATEWAY
ALTERNATIVE ONE

LAYOUT SHEET

PLN 001

ALTERNATIVE TWO SUMMARY

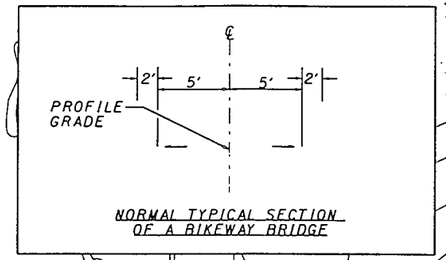
Description:

Alternative Two has a pedestrian/bike bridge that extends from Kauffman Road at the entrance to the Wright Memorial to Marl Road. This pedestrian/bike bridge crosses over the railroad tracks and SR 444 with a minimum 15' clearance. On the north side of SR 444, the path is constructed on fill until it meets existing grade. Alternative Two also widens Marl Road and connects Marl Road into SR 444 at Kauffman Road.

Cost Estimate:

$1,979,603	Pavement
$818,125	Bridge
$316,000	Earthwork
$3,113,700	Subtotal
$622,700	Contingency (20%)
$3,736,400	Subtotal
$ 747,300	Engineering and Construction Management (20%)
$4,483,700	**Total Cost**

FIGURE 10



NORMAL TYPICAL SECTION OF A BIKEWAY BRIDGE

MARL RD.

MATCH EXISTING GRADE USING -3% GRADE

MATCH EXISTING GRADE USING -6% GRADE

BRIDGE/EMBANKMENT

SR 444

KAUFFMAN RD.

LEGEND

- PRAIRIE INBOUND ROAD
- PRAIRIE OUTBOUND ROAD
- BIKE/PEDESTRIAN
- TROLLEY (FUTURE)
- BRIDGE
- TUNNEL
- EXISTING BIKE/PEDESTRIAN

N

0 60 100

CALCULATED

CHECKED

DAYTON GATEWAY
ALTERNATIVE 2

LAYOUT SHEET

PLN 002

ALTERNATIVE THREE SUMMARY

Description:

Alternative Three is similar to the previous concept except that the new bridge also spans Kauffman Road thereby eliminating the at-grade street crossing between the Park entrance and the bridge required in Alternative Two.

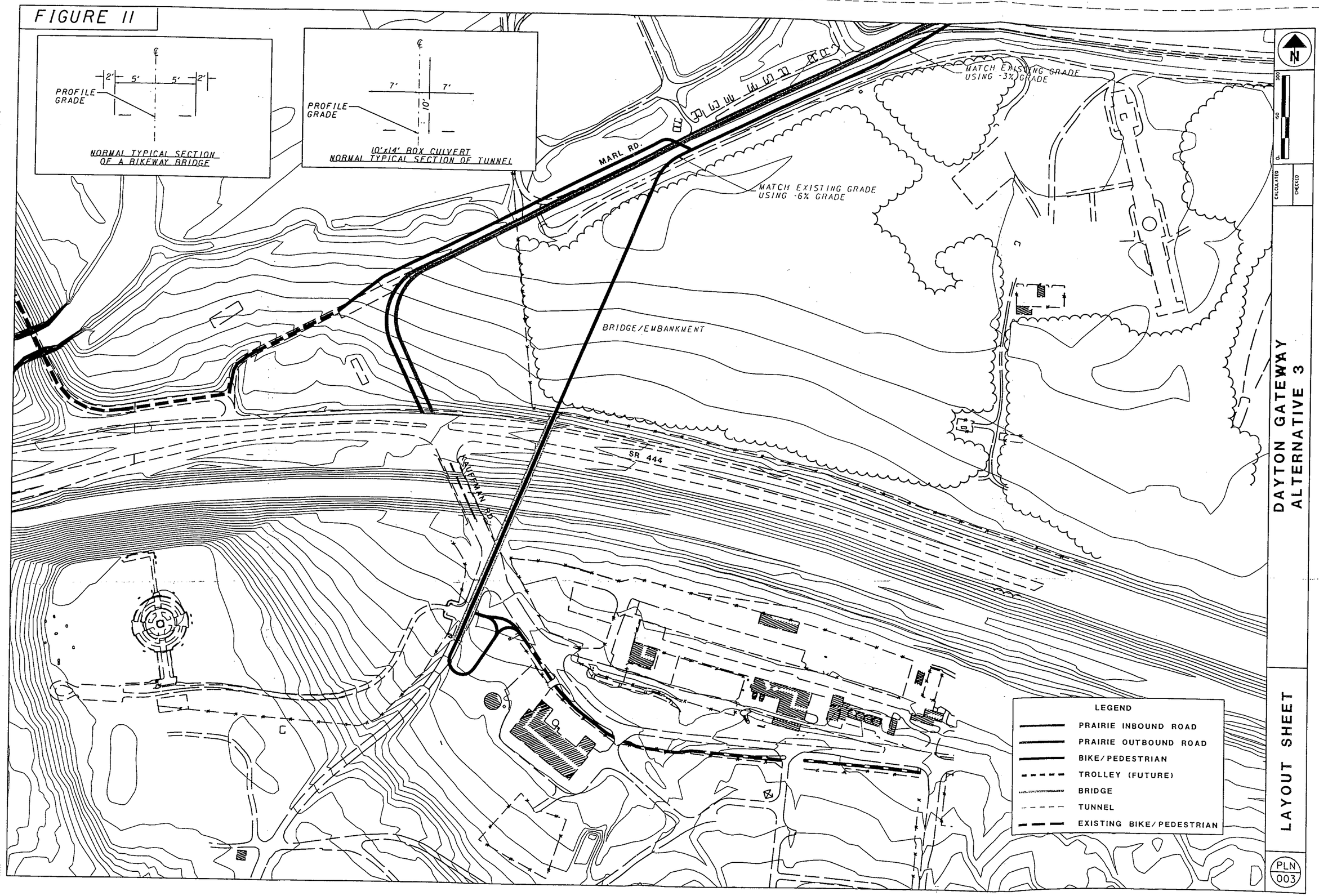
Cost Estimate:

$2,096,363	Pavement
$1,732,500	Bridge
$316,000	Earthwork
$4,144,900	Subtotal
$ 829,000	Contingency (20%)
$4,973,900	Subtotal
$ 994,800	Engineering and Construction Management (20%)
$5,968,700	**Total Cost**

FIGURE II

NORMAL TYPICAL SECTION OF A BIKEWAY BRIDGE

10'x14' BOX CULVERT
NORMAL TYPICAL SECTION OF TUNNEL



ALTERNATIVE FOUR SUMMARY

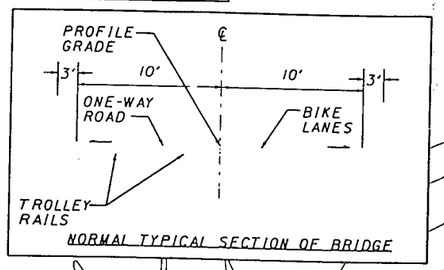
Description:

Alternative Four uses an auto/bike bridge to provide a direct connection from the Memorial to Huffman Prairie Flying Field. The bridge provides inbound movement from Wright Brothers Hill to Huffman Prairie Flying Field via Marl Road. This bridge crosses over Kauffman Road, the railroad tracks, and SR 444. The return trip uses a new one-way road, which connects Marl Road to SR 444 at the intersection of Kauffman Road.

Cost Estimate:

$1,717,512	Pavement
$3,217,500	Bridge
$360,000	Earthwork
$5,296,000	Subtotal
$1,059,000	Contingency (20%)
$6,355,000	Subtotal
$1,271,000	Engineering and Construction Management (20%)
$7,626,000	**Total Cost**

FIGURE 12



NORMAL TYPICAL SECTION OF BRIDGE

MARL RD.

MATCH EXISTING GRADE USING -3% GRADE

MATCH EXISTING GRADE USING -6% GRADE

BRIDGE/EMBANKMENT

SR 444

KAUFFMAN RD.

LEGEND

- PRAIRIE INBOUND ROAD
- PRAIRIE OUTBOUND ROAD
- BIKE/PEDESTRIAN
- TROLLEY (FUTURE)
- BRIDGE
- TUNNEL
- EXISTING BIKE/PEDESTRIAN

N

300 150 0

CALCULATED | CHECKED

DAYTON GATEWAY
ALTERNATIVE 4

LAYOUT SHEET

PLN 004

ALTERNATIVE FIVE SUMMARY

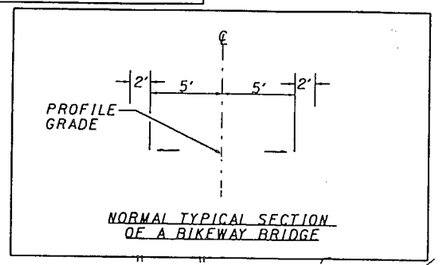
Description:

Alternative Five contains two bridges: a pedestrian/bike bridge and a vehicular bridge. The pedestrian/bike bridge is parallel to Kauffman Road, which goes over the railroad tracks and then crosses under SR 444 via a tunnel (as in Alternative One). The vehicular bridge is similar to that described in Alternative Four, with the exception that it is no longer limited to a 3% grade since bicycles have been shifted to a different route.

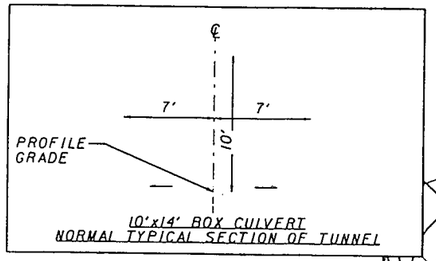
Cost Estimate:

$1,736,692	Pavement
$2,602,875	Bridge
$132,000	Tunnel
$285,540	Earthwork
$4,757,100	Subtotal
$951,400	Contingency (20%)
$5,708,500	Subtotal
$1,141,800	Engineering and Construction Management (20%)
$6,850,300	**Total Cost**

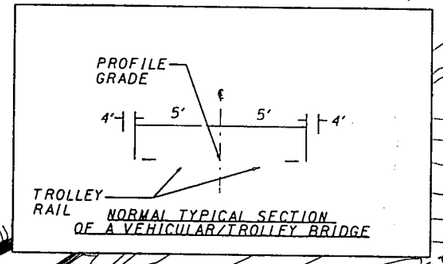
FIGURE 13



NORMAL TYPICAL SECTION OF A BIKEWAY BRIDGE



10'x14' BOX CULVERT NORMAL TYPICAL SECTION OF TUNNEL



NORMAL TYPICAL SECTION OF A VEHICULAR/TROLLEY BRIDGE

MARL RD.

BRIDGE/EMBANKMENT

SR 444

KAUFFMAN RD.

MATCH EXISTING GRADE

MATCH EXISTING GRADE

LEGEND

- PRAIRIE INBOUND ROAD
- PRAIRIE OUTBOUND ROAD
- BIKE/PEDESTRIAN
- TROLLEY (FUTURE)
- BRIDGE
- TUNNEL
- EXISTING BIKE/PEDESTRIAN

N

300 150 0

CALCULATED

CHECKED

DAYTON GATEWAY
ALTERNATIVE 5

LAYOUT SHEET

PLN 005

5.8 Alternative Recommendation

The Gateway Focus Group, at the meeting held November 29, 2000, determined that the preferred option was Alternative 5, subject to further refinements. This option was recommended for the following reasons:

- The direct connection from the Wright Memorial to Huffman Prairie Flying Field significantly improves travel between the sites, providing a more attractive, unified Park experience.

- The direct connection avoids the secure area of Patterson Field, improving base security.

- The bikeway and pedestrian improvements eliminate the at-grade crossing of SR 444, improving safety and enhancing the park experience.

Subsequent refinements to Alternative 5 led to the creation of a sixth alternative. Alternative 6 would provide for two-way traffic on the bridge thereby eliminating the intersection of Huffman Prairie Flying Field outbound traffic (via Marl Road) with SR 444 at Kauffman Road. The bridge typical section (shown on the following exhibit) would provide for two 10-foot wide lanes with 3-foot shoulders on each side. The cost estimate includes costs necessary to support two-way trolley service if it should be added at some future date.

Further discussion among the stakeholders occurred as concepts were being defined and estimates were adjusted to reflect those changes. These activities occurred through December 2000 and into early January 2001 concluding with a meeting of the major stakeholders (WPAFB, NPS, MVRPC, and DAHC). It was determined that Alternative 6 was the preferred solution. This alternative offered several key advantages over Alternative 5:

- Two-way traffic flow on a single route between the Wright Memorial and Huffman Prairie Flying Field is easier for new visitors to navigate for the first time.

- Elimination of the one-way outbound connection from Marl Road to SR444 reduces intrusion of vehicles in the natural environment and increases base security by creating a single access point the Huffman Prairie Flying Field.

- Elimination of a new leg on the intersection of Kauffman and SR444 permits the intersection to operate at a higher level of service.

As the recommended option, Alternative 6 was then examined and developed at a higher level of detail. Additional considerations included in the final design concept are summarized below:

- Fill and flood plain considerations. The MCD requires that any fill placed within the retarding basin of Huffman Dam below elevation 835 feet be compensated by an equal volume of excavation in the basin. The cost estimate for fill material was changed to reflect this. Also, a 10' x 14' box culvert was added for drainage (during flood events exceeding the 100-year flood), which can also be used for the bikeway into Huffman Prairie Flying Field.

- "Towpath" clearance. In order to move certain aircraft from Patterson Field to the museum, the Air Force utilizes a flatbed trailer hauled by a large truck. The route typically uses SR 444 and Kauffman Road and the largest aircraft would be 17 feet in height. Two cost estimates are presented: one with a 15'-6" clearance and one which would allow for a 25-foot clearance (aircraft plus transport).

- Phasing of projects. Cost estimates were prepared according to a phasing plan to allow for funding flexibility and increasing visitation at the sites. Phase I includes the bikeway and its associated bridge and tunnel. This would utilize the appropriation already earmarked for this particular bridge. Phase II encompasses work to reconstruct Marl Road including the "Boulevard" section. Phase III includes the vehicular bridge, connection to Marl Road, and a new roadway to connect the Memorial to the bridge.

The recommended Gateway plan and cost estimate are shown on the following pages. Figure 14 depicts the central area of the plan where the improvements are concentrated. Figure 15 shows the expanded area including all components of the plan, while Figure 16 identifies potential project phasing. The main features of this plan include:

- Direct roadway connection between the Wright Memorial and the Huffman Prairie Flying Field that restores a portion of the historic trolley route used by the Wright brothers

- A unified park experience

- Auto/shuttle bridge over Kauffman Road, freight railroad, and SR 444

- Bicycle/pedestrian connection between the Memorial and Prairie, connecting with the regional bikeway system

- Bicycle/pedestrian bridge over the freight railroad and tunnel under SR 444

- New traffic signal at Kauffman and the Wright Memorial entrance (must be warranted)

- Separation of pedestrians/bicycles from most of the roadway to enhance safety

- Separation of access from Air Force areas to enhance security.

ALTERNATIVE SIX SUMMARY (RECOMMENDED)

Description:

Alternative Six contains two bridges: a pedestrian/bike bridge and a vehicular bridge. The pedestrian/bike bridge is parallel to Kauffman Road, which goes over the railroad tracks and then crosses under SR 444 via a tunnel. The vehicular bridge operates in both direction, and provides for addition of future rail trolley operation. Two estimates are provided for alternative clearances of the auto/shuttle bridge over SR 444. More detailed cost estimates are provided by project phase in Appendix E: Capital Cost Estimate for Recommended Alternative.

Cost Estimate (15.5 foot clearance over SR 444):

$2,269,929	Pavement
$3,592,875	Bridge
$132,000	Tunnel
$60,000	Culvert
$1,456,608	Earthwork
$90,000	Traffic Signals
$1,900,000	Steam Line Relocation
$18,040	Resurfacing
$9,519,452	Subtotal
$1,903,890	Contingency (20%)
$11,424,000	Subtotal
$2,284,800	Engineering and Construction Management (20%)
$13,708,800	**Total Cost**

Cost Estimate (25 foot clearance over SR 444):

$2,450,049	Pavement
$3,592,875	Bridge
$132,000	Tunnel
$60,000	Culvert
$2,673,952	Earthwork
$90,000	Traffic Signals
$1,900,000	Steam Line Relocation
$18,040	Resurfacing
$10,916,916	Subtotal
$2,283,383	Contingency (20%)
$13,101,000	Subtotal
$2,620,200	Engineering and Construction Management (20%)
$15,721,200	**Total Cost**